Remarks

Applicant respectfully requests reconsideration of this application as amended. Claim

18 has been amended. Claim 25 has been added. No claims have been cancelled. Therefore,

claims 1-25 are presented for examination.

35 U.S.C. §103(a) Rejection

Claims 1, 2, and 7-24 stand rejected under 35 U.S.C. §103(a) as being unpatentable

over Shek et al. (*Dynamic Spatial...*) in view of Huang et al. (*A Spatial Clustering...*).

Applicant submits that the present claims are patentable over Shek in view of Huang.

Shek discloses a system for broadcast data dissemination in an Intelligent Mobile

Information System. The Intelligent Mobile Information System supports information-

centered applications that require support for a large number of distributed mobile users

collaborating on a common mission and with interests in a common situation domain.

Broadcast data dissemination is most effective when each broadcast information packet has

multiple interested parties. To maximize the value of multicast dissemination, the system of

Shek dynamically clusters similar user profiles into aggregate user classifications that are

served by independent multicast channels of custom information packets. (Shek at Abstract.)

Huang discloses an approach that clusters mobile users before downlink beamforming

and broadens beams within the beamforming calculation. First, the broadening beamforming

scheme is investigated to alleviate inaccuracies in DOA estimation. Then, it is determined

how to group the mobile users, with the constraint of separation angle, to enhance downlink

beamforming. (Huang at Abstract.)

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Claim 1 recites:

A method for beamforming in wireless communications, comprising:
    identifying one or more target(s) for which a communication signal is intended;
    identifying one or more other target(s) which may benefit from receipt of the communication signal; and
    developing a multi-lobe beampattern to transmit the communication signal to the intended target(s) and the identified one or more other target(s).

The Examiner combines the references of Shek and Huang as disclosing the features of claim 1 under a 35 U.S.C. §103 obviousness rejection. Applicant submits that the Examiner has failed to establish a prima facie case of obviousness under 35 U.S.C. §103. As provided in the MPEP §2143, to establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Third, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

Proposed Modification Cannot Change The Principle of Operation of a Reference:

First, with regard to a suggestion or motivation to modify the reference or combine reference teachings, the proposed modification cannot change the principle of operation of a reference. (MPEP §2143.01 VI.) "If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie obvious*." (Id.) Applicant submits that modifying Shek by Huang would change the principle of operation of Shek and Huang. The suggested combination of modifying Shek with Huang would require

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a substantial reconstruction and redesign of the elements shown in Shek and Huang, as well as a change in the basic principle under which Shek and Huang were designed to operate.

Shek deals with dynamically clustering similar user profiles into aggregate group profiles that are served by independent multicast channels of custom information packets. (Shek at pg. 133, §1.) Shek presents a new approach to previous clustering algorithms by dynamically clustering mobile users *based on their spatial domains of interest*. (Id.) Specifically, Shek states "[o]ften *spatial clustering* has been solely based on Euclidean distance among moving entities. This measure may be ineffective in real world situations where, rarely, actual distance between pairs of entities moving along defined paths coincides with their Euclidean distance." (Id. at pg. 134, §2.) Shek presents a clustering algorithm where "user profiles are augmented with information such as: user's location, movement, direction, speed. Furthermore, distance among entities is the real-world physical distance based on the [cartographic] map representation by taking into account the actual shape and length of real routes." (Id.)

Accordingly, the basic principle of Shek's teachings particularly deals with providing a unique clustering algorithm based on measurements other than Euclidean distance. For example, Shek states that "to generate profile clustering to allow effective information dissemination differs from existing conceptual algorithms in that the goal of the clustering is more than only to optimize the accuracy of clustering." (Id at pg. 138, §3.)

On the other hand, Huang deals with clustering mobile users before downlink beamforming. (Huang at pg. 191, Abstract.) Huang clusters users before downlink beamforming by carefully choosing angular spread (AS) and forming the same beamforming weight vector for the same group. (Id. at §1.) Huang is specifically concerned with the prior

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art problem of capacity limitation and co-channel interference of SDMA systems. (Id.)
Hunag notes that prior art systems had AS of up to 15 degrees which meant that the estimate
downlink beamforming pattern degraded system performance due to narrow, misaligned
nulls. (Id.)

As a result, Huang is concerned with providing a solution to the clustering and
beamforming approach that solely *optimizes* downlink beamforming to improve over the
prior art performance. Specifically, Huang approaches the clustering for optimal downlink
beamforming on page 193, where five steps are provided for the grouping and downlink
beamforming calculation algorithm of Huang. Note, in particular, step 2 which assigns users
to a group *only if* $\Delta\theta < AS$. Huang relies on angle spread and angle separation of user groups
as its sole means for decreasing computational complexity of a base station in clustering and
beamforming. (See id. at pg. 192-193, §4.)

Modifying Shek with Huang, and vice versa, would change the principle of operation
of both Shek and Huang. Modifying Shek by Huang, as suggested by the Final Office
Action, results in Shek having to utilize only the grouping and beamforming algorithm of
Huang. As stated above, Huang relies on only angular spread and angle separation in its
algorithm to produce optimal clustering and beamforming (which is the goal of Huang).
However, Shek is concerned with clustering users based on factors other than Euclidean
geometry of the users. This modification would change the principle of operation of Shek as
it would require a substantial reconstruction and redesign of the elements of Shek to only be
based on Euclidean geometry, which speaks against the goal of Shek. The modification
would also require a change in the basic principle under which Shek was designed to operate

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because Shek would have to be modified to only deal with angle separation and angular

spread, rather than the user spatial domains of interest Shek relied on.

Similarly, the modification would change the principle of operation of Huang as it

would require a substantial reconstruction and redesign of the elements of Huang to account

for factors other than Euclidean geometry in its grouping and beamforming algorithm, which

speaks against the goal of Huang to provide for the most optimal grouping. Shek specifically

states that its clustering factors are based on goals other than optimizing clustering. In

addition, the modification would also require a change in the basic principle under which

Huang was designed to operate because Huang would have to be modified to deal with

factors other than angle separation and angular spread in determining its clustering algorithm.

As a result, combining Shek and Huang under a 35 U.S.C. §103 obviousness rejection

would change the principles of operation of both Shek and Huang. Applicant respectfully

submits that the Examiner has not established a prima facie case of obviousness under 35

U.S.C. §103. Accordingly, applicant respectfully requests the withdrawal of the 35 U.S.C.

§103 rejection against the present claims.

Prior Art References When Combined Must Teach or Suggest All Claim Limitations:

Second, applicant submits that Shek in view of Huang does not disclose each and

every feature of claim 1. To establish a prima facie case of obviousness, "the prior art

reference (or references when combined) must teach or suggest all the claim limitations."

(MPEP §2143.)

Applicant submits that Shek in view of Huang does not disclose or suggest

developing a multi-lobe beampattern to transmit the communication signal to the intended

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target(s) and the identified one or more other target(s), as recited by claim 1. The Office

Action acknowledges that "Shek does not disclose or suggest developing a multi-lobe

beampattern to transmit the communication signal to the intended target(s) and the identified

one or more other target(s)." (Final Office Action mailed 8/23/06 at pg. 3, pt. 4.) However,

the Office Action does cite Huang as disclosing this feature at page 193 and Figure 6 of

Huang. (Id.)

The Final Office Action and Advisory Action cite Huang at page 193 and Figure 6.

However, applicant can find no disclosure or suggestion anywhere in Huang of developing a

multi-lobe beampattern *to transmit the communication signal to multiple users*. Although

Huang may discuss in its 5-step algorithm grouping users into a cell for downlink

beamforming and selective calculation for downlink beamforming weight for a group, Huang

does not also discuss then transmitting this communication signal to multiple targets via the

multi-lobe beam pattern.

Furthermore, in the Response to Arguments section of the Final Office Action, the

Examiner relies on the *combination* of Shek and Huang to respond to the above argument.

Specifically, the Examiner states that "Shek communicates a signal to multiple users" and

Huang discloses developing a multi-lobe beampattern." (Id. at pg. 12, pt. 26.) However,

applicant submits that utilizing a multi-lobe beam pattern to transmit a same signal to

multiple users is not obvious solely from the disclosure in Shek of communicating signals to

multiple users. Developing the multi-lobe beam pattern to transmit a signal to multiple users

would not be obvious to one skilled in the art.

For the above reasons, applicant can find no disclosure or suggestion anywhere in

Huang of the above-cited feature of claim 1. Therefore, as neither of Shek nor Huang

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individually disclose or suggest <u>developing a multi-lobe beampattern to transmit the communication signal to the intended target(s) and the identified one or more other target(s),</u> any combination of Shek and Huang also does not disclose or suggest such a feature. Therefore, claim 1 is patentable over Shek in view of Huang.

Independent claims 9 and 18 also recite, in part, <u>identifying one or more other target(s) which may benefit from receipt of the communication signal</u> and <u>developing a multi-lobe beampattern to transmit the communication signal to the intended target(s) and the identified one or more other target(s)</u>. Therefore, claims 9 and 18, as well as their respective dependent claims, are patentable over Shek in view of Huang for the reasons discussed above with respect to claim 1.

Claims 3-6 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Shek in view of Huang, and further in view of Gleeson (U.S. Patent No. 6,477,160). Applicant submits that the present claims are patentable over Shek and Huang, even in view of Gleeson. Claims 3-6 depend from independent claim 1. As discussed above, independent claim 1 is patentable over Shek in view of Huang. Gleeson does not remedy the defects of Shek and Huang in light of claim 1. Therefore, claims 3-6 are patentable over Shek and Huang, in view of Gleeson.

For the above reasons, applicant submits that a prima facie case of obviousness has not been established against the present claims. As such, the present claims are patentable over Shek in view of Huang under a 35 U.S.C. §103 rejection.

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Applicant respectfully submits that the rejections have been overcome and that the claims are in condition for allowance. Accordingly, applicant respectfully requests the rejections be withdrawn and the claims be allowed.

The Examiner is requested to call the undersigned at (303) 740-1980 if there remains any issue with allowance of the case.
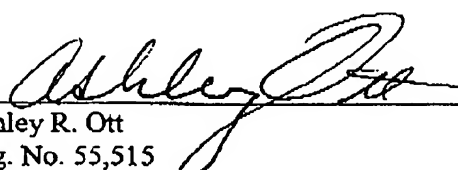
Applicant respectfully petitions for an extension of time to respond to the outstanding Office Action pursuant to 37 C.F.R. § 1.136(a) should one be necessary. Please charge our Deposit Account No. 02-2666 to cover the necessary fee under 37 C.F.R. § 1.17(a) for such an extension.

Please charge any shortage to our Deposit Account No. 02-2666.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Date: November 9, 2006

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